MEMORANDUM

Date: August 8, 1988

Subject: Remedial Levels for South Cavalcade Site

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To: South Cavalcade Files

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Surface and Surfacial Soils

Surface and surficial soils include those soils onsite from the surface down to approximately 6 feet. The RI report identified three areas of contamination in these soils based on observed soil staining, 8 aromatic hydrocarbon samples, and 7 analytical samples. These areas correspond to the creosoting operations area at Merchants, the tar plant at Palletized, and a waste area at Transcom. Presently, only some of the soils are exposed. The soils at Merchants and Palletized are mostly under buildings and concrete trucking lots at these businesses; the soils at Transcom are more accessible but are not in the areas used by that business.

The Koppers Company conducted a risk assessment as part of the Feasibility Study. The risk assessment looked at exposures to onsite commercial occupants, construction workers, utility workers, and potential residents. It used assumptions similar to those of the North Cavalcade risk assessment with the principal differences being that volatilization of PAHs was shown to not pose substantial exposure and present commercial exposure was added. Most of the risk was found to be due to exposure to carcinogenic PAHs. Based on cleaning only the PAHs, the following range of cleanup levels were developed from maximum risk calculations:

RANGE OF POSSIBLE CLEANUP GOALS FOR SOILS

RISK LEVELS	10^{-4}	10^{-5}	10^{-6}
PRESENT EXPOSURE			
Utility Workers	13,700	1,370	135
Commercial Occupants	10,700	1,060	103
POTENTIAL EXPOSURE			
Construction Workers	700	69	6
Potential Residents	322	19	nc

The FS report proposes a cleanup level of 700 ppm carcinogenic PAHs Based on the current land use, utility worker and commercial occupant scenarios would be exposed to a cancer risk of less than 10^{-5}. This risk level has typically been used for commercial and industrial developments.

Construction workers and residents would become exposed to risks under future land development. At the proposed cleanup level, construction workers would be exposed to a 10^{-4} risk and residents to over 10^{-4}. However, most areas where PCOCs were observed in surface and surficial soils are already developed and to a large degree covered with re-inforced concrete and buildings. The site is also surrounded on 3 1/2 sides by commercial and industrial development (chemical and oil storage tanks, warehouses, abandoned waste ponds, and office buildings). Future development is possible although unlikely, and

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residential development is very unlikely without destroying the present commercial structures. Therefore, a 700 ppm carcinogenic PAH concentration is protective of human health from reasonable future exposures.

Surface and surficial soils also contain PAHs which may continue to leach into the groundwater. From the treatability study, PAHs were observed to leach from soils following application of tap water. The residual level in the soils was 140 ppm total PAHs in the test. The level of PAHs in soils which will not substantially leach will vary from site to site and also between areas inside a site due to various factors such as organic content, porosity, and water content. Therefore, a remedial goal cannot be set for soils to control leaching. Instead, the soils in the areas targetted for potential remediation must be sampled during the Remedial Design.

Groundwater

Groundwater can also contain contaminants which may pose a risk if people become exposed to them. From the Remedial Investigation report, PAHs were observed to migrate to lower depths. The risk assessment explained that, due to fractures in clay layers (slickenslides) and an old well possibly serving as a conduit to lower aquifers, the groundwater concentrations in lower aquifers cannot be accurately quantified. Assuming a worst case situation in which non-aqueous phase liquids (NAPLs) migrate into an aquifer usable as a source of potable water and the aquifer becomes conatminated to the same degree as are the upper aquifers, the maximum risk could be as high as $5x10^{-2}$ and the non-carcinogenic risk as high as 9.

EXISTING RISKS FOR GROUNDWATER

	MCLs (ug/l)	MCLGs (ug/l)	Concentrations Onsite (ug/l)	Concentrations Offsite (ug/l)	Risk	Hazard
Arsenic	50	--	522	55	$2.2x10^{-2}$	--
Benzene	5	0	930	<5	$1.4x10^{-3}$	--
Carc. PAHs	--	--	84	<10	$2.8x10^{-2}$	--
Chromium	50	--	450	30	--	2.6
Copper	--	1300	1340	17	--	1.0
Ethylbenzene	--	680	470	<5	--	0.1
Lead	50	20	160	34	--	3.3
Toluene	--	2000	1000	<5	--	0.1
Xylenes	--	440	1100	<5	--	1.6
Zinc	--	--	1180	<5	--	0.2
TOTALS					$5.1x10^{-2}$	8.9

Therefore, it is necessary to remediate the upper aquifer to as close to drinking water quality as practical. The proposed remedial goals for the two upper aquifers containing PCOCs are Maximum Contaminant Levels (MCLs) for metals and benzene, no detectable carcinogenic PAHs under current laboratory procedures, and no non-aqueous phase liquids (NAPLs). As shown below, and using the observation from this site and North Cavalcade that no detectable carcinogenic PAHs using CLP laboratory techniques results in no detectable carcinogenic PAHs at the 100 ng/l level, the maximum cancer risk is $4x10^{-5}$ and the non-carcinogenic hazard is 1:

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PROPOSED GROUNDWATER REMEDIAL GOALS

	Basis for the Cleanup Goal	Goal (ug/l)	Risk	Hazard
Arsenic	MCL & Background	50	*	--
Benzene	MCL	5	7.4×10^{-6}	--
Carc. PAHs	No Detection	nd	3.3×10^{-5}	--
Chromium	MCL & Background	50	--	--
Copper	Equal To Metals	50	--	*
Ethylbenzene	No Action	470	--	<0.1
Lead	MCL & Background	50	--	0.1
Toluene	No Action	1000	--	*
Xylenes	Proposed MCLG	440	--	0.1
Zinc	No Action	1180	--	0.6
TOTALS			4.0×10^{-5}	1.0

*Not calculated because goal equals background

The above calculations are higher that what is truely expected because the metal concentrations are based on total rather than dissolved metals. This is shown by the high background concentrations. These numbers are not suspected of being a result of site specific sampling problems because the same background numbers were found at the North Cavalcade site.

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